

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of:

Isao Kurihara et al.

Conf. No.: 4470

Group Art Unit: 1764

Appln. No.: 10/800,949

Examiner: Ellen M. McAvoy

Filing Date: March 15, 2004 Attorney Docket No.: 8305-239US

(NP149-1)

Title: LUBRICATING OIL COMPOSITION FOR INTERNAL  
COMBUSTION ENGINE

DECLARATION UNDER 37 C.F.R. § 1.132

I, Isao Kurihara, declare and state that:

1. I graduated from Tokyo University of Science, Faculty of Engineering and Department of Industrial Chemistry and was conferred a master's Degree from the same university.

I was employed by Mitsubishi Oil Co., Ltd. in 1993. Currently, I am employed by Nippon Oil Corporation, which is the assignee of the above-identified patent application in their Lubricants Research Laboratory, where I have been actively engaged in the research and development of lubricating oils, focusing on particularly lubricating oils for transmissions.

2. I am well acquainted with the field of lubricating oils and therefore conducted experiments described below on behalf of the assignee.

3. I have reviewed the final Office Action dated October 31, 2007 in the above-identified patent application, and copies of U. S. Patent Nos. 6,569,818 B2 (Nakazato et al., "Nakazato"), 5,552,068 (Griffith, "Griffith"), and 6,306,801 B2 (Yagishita et al., "Yagishita") in which the Examiner has

rejected all of the pending claims under 35 U. S. C. §103 (a) over Nakazato in combination with Griffith, or Yagishita in combination with Nakazato and Griffith.

This Declaration has been prepared to address the arguments made by the Examiner in support of his rejections of the claims.

4. It is my understanding that the Examiner's positions are as follows.

(1) Nakazato discloses a lubricating oil composition comprising the components (A) to (C), or (A) to (C), and (E), which are each recited in the claims of the present application but does not teach the component (D), which is a phosphorus-containing ashless anti-wear agent and selected from the group consisting of amine salts of phosphoric acid esters and amine salts of phosphorus acid esters.

However, the amine salts of phosphoric acid esters are known in the art as extreme pressure/anti-wear agents as taught by Griffith.

Therefore, it would be obvious to those skilled in the art to add amine phosphate salts to the lubricating oil composition of Nakazato in order to provide the composition with the desired properties as claimed including anti-wear properties.

(2) Yagishita discloses a lubricating oil composition comprising the components (A) to (C), which are each recited in the claims of the present application but does not teach the component (D), which is a phosphorus-containing ashless anti-wear agent and selected from the group consisting of amine salts of phosphoric acid esters and amine salts of phosphorous acid esters, and the component (E).

However, Nakazato teaches a lubricating oil composition, which may contain organic amide compounds such as oleylamide. Further Griffith teaches amine salts of phosphoric acid esters as extreme pressure/anti-wear agents as described

above.

Therefore, it would be obvious to those skilled in the art to add organic amide compounds and amine phosphate salts to the lubricating oil composition of Yagishita in order to provide the composition with the desired properties as claimed including anti-wear properties.

5. In order to overcome the Examiner's rejection, we have amended the current Claims 1 and 2 by limiting Component (D), i.e., a phosphorus-containing ashless anti-wear agent to amine salts of phosphorous acid esters and the upper limit sulfated ash content in the composition to 0.59 percent by mass.

6. Further, in order to demonstrate and prove the advantages of the amended claimed composition, I have conducted further additional comparative experiments as Reference Examples 4 to 6 in the same manner employed in the Examples in the specification.

The compositions of Reference Examples 4 to 6 were each prepared by replacing the amine salt of phosphorous acid ester used as (D) Component in the compositions of Inventive Examples 2, 6 and 7 with an amine salt of phosphoric acid ester as set forth in Table B below, and adjusting their P concentrations to the same levels as those of Inventive Examples 2, 6 and 7, respectively.

The experimental results of Reference Examples 4 to 6 are set forth in Table B below together with the results of the Inventive Examples 2, 6 and 7 and Reference Examples 1 to 3 as submitted in our previous response for comparison.

Table B

	Ex. 2	Ref. 1	Ref. 4	Ex. 6	Ref. 2	Ref. 5	Ex. 7	Ref. 3	Ref. 6
(A)ucioinimide-based ashless dispersant (N concentration)	80 0.13	80 0.13	80 0.13	80 0.13	80 0.13	80 0.13	80 0.13	80 0.13	80 0.13
(B)metallic detergent									
Ca salicylate				2.0	2.0	2.0	2.0	2.0	2.0
Ca sulfonate	0.8	0.8	0.8						
(C)Zn sec-alkylthiophosphate (P concentration)	0.06	0.06	0.06	0.70 0.068	0.70 0.068	0.70 0.050	0.40 0.029	0.40 0.029	0.40 0.029
(D)phosphorus-containing ashless antiwear inhibitor									
Phosphite		0.8			0.5			0.4	
Amine salt of phosphite				0.6			0.5		
Amine salt of phosphate	1.0		0.6			0.35			0.3
(P concentration)	0.025	0.025	0.025	0.015	0.015	0.015	0.013	0.013	0.013
(E)fatty acid amide									
Other additives	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Ca concentration	0.10	0.10	0.10	0.12	0.12	0.12	0.12	0.12	0.12
Zn concentration	0.074	0.074	0.074	0.055	0.055	0.055	0.031	0.031	0.031
P concentration	0.083	0.083	0.083	0.065	0.065	0.065	0.041	0.041	0.041
N concentration	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17
Sulfated ash content	0.57	0.57	0.57	0.59	0.59	0.59	0.56	0.56	0.56
(1)High-velocity four-ball wear test									
Wear scar diameter(Fresh oil)	0.35	0.36	0.35	0.35	0.42	0.37	0.36	0.45	0.40
Wear scar diameter(Oil deteriorated by ISO TD)	0.40	0.40	0.42	0.35	0.53	0.45	0.40	0.57	0.51
(2)Hot tube test									
Rating	7.0	6.5	6.5	7.5	7.5	7.5	8.0	8.0	8.0

Amine salt of phosphate: Oleylamin salt of Oleyl acid phosphate, phosphorus content 4.2 mass %

7. It is apparent from the results set forth in Table B that the composition of Reference Example 4, which contains the amine salt of phosphoric acid ester as (D) Component, exhibited poor high temperature detergency in the Hot tube test, though it exhibited almost the same extent of anti-wear properties in the High-velocity four-ball wear test, as that of Inventive Example 2.

Further the compositions of Reference Examples 5 and 6, which contain the amine salt of phosphoric acid ester as (D) Component, exhibited poor anti-wear properties in the High-velocity four-ball wear test, though they exhibited almost the same extent of high temperature detergency in the Hot tube test, as those of Inventive Examples 6 and 7, respectively.

8. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: February 18, 2008 Isao Kurihara  
Isao Kurihara